

## **Addendum to EPA Internal Review of Gold King Mine Incident**

This addendum provides clarity pursuant to additional information that has become available since the initial EPA Internal Review report was issued on August 26, 2015. This includes information presented in the October 2015 Department of the Interior/Bureau of Reclamation (BOR) Technical Review of the Gold King Mine Incident (DOI Report), as well as reservations expressed by the US Army Corps of Engineers (USACE) peer reviewer regarding internal EPA communication and coordination, especially in light of the work at the site on August 4 and 5 and the planned August 14 consultation with the Bureau of Reclamation (BOR).

Since the EPA internal review report did not identify this coordination as an area of concern or include any extensive related discussion, we reviewed these findings and conducted a follow up interview with the two On-Scene Coordinators (OSCs) most closely associated with the event. The interview focused primarily on the coordination and communication and the “handoff” of site management between the two OSCs, and how the work being conducted on August 4 and 5 related to the planned August 14 consultation with BOR, including consultation and collaboration with the Colorado Division of Reclamation and Mine Safety (DRMS).

The narrative that follows is intended to clarify any misunderstandings about the incident (including the intent of activities on August 4 and 5), as well as to shed light on the historical collaboration with expert parties external to EPA in the work in the Animas River mining district.

A list of planned questions is attached. However, the interviews took the form of a discussion, and the questions were not asked explicitly but were used as a guide to ensure all key issues were addressed.

The meeting took place on December 2, 2015, in EPA Region 8 office in Denver. Participants were:

Steve Way, Region 8 OSC

Hays Griswold, Region 8 OSC

Laura Williams, Region 8 Supervisor

Nancy Grantham, HQ OPA/OA

Dana Stalcup, HQ OSWER/OSRTI

What follows is a narrative account of some of the activities that led up to the Gold King Mine release on August 5, 2015, and serves to respond to some of the issues raised by the USACE peer reviewer for the DOI Report.

The Colorado Division of Reclamation and Mine Safety (DRMS) took action to address mine drainage into water resources in the Upper Animas by issuing a permit in 1986 for work on the Gold King Mine (GKM) site adits. In 2008, the state continued its effort by constructing a discharge diversion structure (flume channel) to prevent additional water from pooling behind GKM adit blockages and by developing a Gold King Mine Reclamation Plan in 2009 to address increased water pressure within the Gold King workings. DRMS' 2009 project summary states: "The mine drainage and the collapse at the Level 7 Portal continues to be of concern to the landowner, DRMS, and the Animas River Stakeholders Group (ARSG). A future project at the site may attempt to cooperatively open the Level 7 Portal in an effort to alleviate the potential for an unstable increase in mine pool within the Gold King workings."

There is a long history of collaborative work by EPA, DRMS, and ARSG regarding the acid mine drainage from the abandoned mines in the Upper Animas River mining district. The GKM site was one of the mines/adits that EPA agreed to take the lead on for assessment and potential work. Steve Way was the lead OSC, with support from others, including Hays Griswold, as needed.

At the request of DRMS, by 2014 EPA was working with DRMS to take action at the GKM site to address both the potential for a catastrophic release and the ongoing adverse water quality impacts caused by the significant mine discharges into the Upper Animas Watershed.

Preliminary assessment work by EPA and DRMS at the GKM site was initiated in September of 2014. Specifically, excavations were performed to remove the metal grating and portions of two pipes installed by DRMS in 2009. It quickly became obvious that more extensive assessment work would be needed before any bulkheading/plugging of the mine adit or other action could be taken. Work stopped after 2 days when DRMS and EPA staff observed additional seepage and the project was put on hold until the following year due to the coming winter weather.

Throughout the winter and early spring months of 2015, EPA, DRMS and others were developing plans for an approach to assess a path forward for the GKM site. Per Steve Way's direction, the EPA contractor brought on a mining expert subcontractor to support site activities. Steve Way also worked with DRMS and contractors to develop a conceptual plan. Among other possibilities, one potential approach was to be similar to the approach ultimately taken at the nearby Red and Bonita mine, that being to find a way to reduce the water levels, then to remove any blockages, and then investigate the mine for potential source control options and to have a stable condition before the closure of the Red and Bonita bulkhead valve (due to the potential impact on GKM).

In May of 2015, EPA and DRMS presented their plans for removal investigation at the GKM site adit, including work on the Red and Bonita bulkhead, to ARSG, who had long seen the GKM site as a priority in the Animas River mining district (see attached Powerpoint presentation given by Steve Way, EPA, and Allen Sorenson, DRMS).

During the summer 2015 construction season, at the same time that the assessment work was being planned for the GKM site, Steve Way was also working on completing the work at Red and Bonita mine, some of which had been done in 2014; the work at Red and Bonita included drawing down the mine pool water, clearing blockages, and installing an engineered bulkhead with flow control. Since contractor crews and equipment, as well as the EPA and DRMS team, were available in the immediate Animas River Mining district the week of August 3, Steve Way had planned some coordinated work at the GKM site (reflected in the attached project plan). Steve Way had a long-planned vacation scheduled for the first week of August, and at least 2 months in advance he requested Hays Griswold manage the site work while he was out, specifically the preparatory and assessment work to be conducted at GKM site. Specifically, Steve Way identified the following work: adit drainage control; water management system; excavation above adit/hill slope; and adit face excavation. This work was to assess the site conditions and to help prepare for a decision on future work. The water management system would be needed if there was a decision to open the GKM site adit since there was potentially significant water buildup in the adit. The excavation above and at the face of the adit was needed to determine the exact location and condition of the blockage, and the exact location of the bedrock above and around the adit. This information was needed to inform options to be considered for future work, which would be discussed during a consultation meeting planned for August 14 (discussed in more detail below). In addition to providing the direction via e-mail (attached), Steve Way also provided clear verbal direction to Hays Griswold, the EPA contractors, and DRMS staff not to proceed with any work on actually opening the adit until after his return and the planned consultation on August 14.

While Steve Way left direction for Hays Griswold and the team regarding the preparatory work while he was out, he also was planning potential future actions. He previously had initiated an interagency tasking and funding for BOR to provide support and advice for the Red and Bonita Mine. Just prior to leaving for vacation, Steve Way contacted Mike Gobla of BOR and requested that he be part of a consultation meeting at the GKM site on August 14. EPA was assembling a team of experts to help inform the decision as to how to proceed with the GKM site adit work. The preparatory and assessment work being conducted on August 4 and 5 were a key part of preparing for the consultation meeting on August 14, to allow the team to know the site conditions more precisely and put EPA in a better position to make the most informed decision possible regarding future work.

Hays Griswold and the team (including Allen Sorenson of DRMS and contractors) arrived at the site and began some excavation work on August 4. Under Hays' direction, the team slowly and carefully scraped away loose soil and rubble near the face of the adit with the initial goal of locating the primary blockage. By the end of the day, the team had located the blockage, which they were able to identify as the blockage based on the tightness and condition of the material. They decided to wait until the following day, when Bruce Stover and Allen Sorenson of DRMS would also join them, to continue additional excavation. On August 5, under the direction of Hays Griswold, and with consultation from DRMS as well as contractor support, the team began additional excavation to identify the location of bedrock above and around the adit. Through this careful scraping and excavation, they were able to locate the bedrock. Prior to the final excavation and cleanup, the DRMS personnel left the site to proceed to other nearby mining sites. Hays Griswold continued to oversee the final cleanup work, which included clearing of the loose colluvium near the adit. Just prior to finishing, the team noticed a water spout a couple of feet high in the air near where they had been excavating above the top of the adit. Within a few minutes, the spout had turned into a large gush of yellow/orange water that ultimately resulted in a release of an estimated three million gallons.

In retrospect, and based on information learned after the adit had been excavated later in the summer, Way and Griswold determined that Griswold and the team were much closer to the brow of the adit when excavating on August 5 than they thought, perhaps only a foot or so above the adit brow, which turned out to be approximately 19 feet above the adit floor, due to additional collapsing above the original portal location. The fact that the adit opening was about 2 times the assumed 8 to 10 foot maximum adit height resulted in a closer than anticipated proximity to the adit brow, and combined with the pressure of the water was enough to cause the spout and blowout.

In summary, highlighted below are the key factors relative to EPA's work at the GKM site on August 4-5:

- Steve Way (Way), the lead EPA OSC, coordinated at least 2 months in advance with EPA OSC Hays Griswold (Griswold) for Griswold to manage the site during a long-planned vacation in early August 2015.
- In addition to extensive experience in dealing with abandoned mines, both Griswold and Way are specifically familiar with the Upper Animas Mining District and with the GKM site, and thus Griswold was an appropriate replacement while Way was on vacation (see attached memo dated December 4, 2015). Also, while the EPA OSC is the final decision-maker at the site, the two DRMS employees, Sorenson and Stover, are considered by EPA to be experienced experts in the mining field.
- Way left specific instructions with Griswold, the contractors, and DRMS, that they were to conduct preparatory work during the week of August 3 while he was out (see attached email).
- Allen Sorenson of DRMS was working under an EPA cooperative agreement (attached) for the Red and Bonita Mine. The cooperative agreement statement of work included

evaluation of the Gold King Mine in coordination with the Red and Bonita work:

“Additional work may include DRMS assistance with monitoring and assessing impacts caused by the Red and Bonita bulkhead on the hydrology of the Cement Creek and Upper Animas drainages, particularly related to discharges from vicinity mines.”

- The work being conducted on August 4 and 5 was completely consistent with the direction provided by Way. It was assessment work that needed to be conducted to expose the portal and surrounding bedrock to allow observation of the portal conditions for development of a detailed plan to reopen the adit. It included setting up a water management system, potential excavation above the adit, and excavation at the face of the adit. It did not include any work on actually opening the adit.
- Also, in late July, prior to leaving for vacation, Way contacted Mike Gobla at BOR and requested their support at GKM on August 14. This was to be a meeting among the entire team (EPA, contractors, DRMS, and BOR) to discuss potential removal actions at GKM site, such as possibly removing water, removing blockages, and installing an engineered bulkhead. Other possible actions would also be considered and discussed at the August 14 meeting.
- The excavation work on August 4 and 5 was ultimately a decision to be made by the EPA OSC Hays Griswold, with advice from qualified and experienced personnel, including DRMS staff and EPA on-site contractors. The purpose of the excavation was to locate the adit blockage, and to locate competent bedrock above the top of the adit. The specific locations of the blockage and the surrounding bedrock were critical to informing the discussion on August 14 and the subsequent decision on possible removal work such as opening the adit and investigating the mine for sources of water inflow and possible source control. This had been discussed at length with DRMS and the ARSG over the preceding year as an appropriate objective associated with the bulkhead plans for the Red and Bonita mine, which is approximately 400 to 500 feet lower on the same mountain slope.
- The team began their excavation work on August 4, with very deliberate and careful excavation focused on removing loose soil and rubble. By the end of August 4, the onsite team had located the blockage, with a high level of confidence, based on the tightness and conditions of the material. However, they had not yet located the bedrock above the adit.
- On August 5, the onsite team under Griswold’s direction continued to carefully scrape away and remove the loose soil and rubble until they finally located the bedrock. The team had just finished locating the bedrock, and were clearing away some additional rubble in front of the adit face, when they spotted a water spout, followed shortly thereafter by the large release of water.
- Both the EPA Internal Report and the DOI report discuss plans to install a stinger as a means for checking hydraulic pressure and drawing down water. The stinger or well point pipe installation was to be performed by Harrison Western after they had assessed the area exposed during the initial work on August 4 and 5. The final determination on how to proceed was going to be made following the scheduled meeting with BOR on August 14.

- Both the EPA Internal Report and the DOI report discuss the approach of drilling from above as was done successfully at the Red and Bonita mine, informing the decision on how to reopen the adit. However, drilling a hole from above at the GKM site would have been significantly more difficult, due to the challenge of finding a safe, stable location above the adit, the length and angle for such a drilling, and the uncertainty of how the process might impact the stability of the adit.
- In summary, the work on August 4 and 5 was assessment and preparatory work being conducted (using EPA removal assessment dollars) to better inform a planned consultation on August 14. There was no plan or intent to begin digging out the collapsed/non-engineered plug blockage on August 4 or 5. The work being conducted on August 4 and 5 was completely consistent with the direction provided by the primary OSC Steve Way prior to his leaving for vacation, to help plan for the August 14 meeting and potential future work. OSC Hays Griswold was contacted at least 2 months earlier by Steve Way to substitute for him in early August at Gold King Mine and was an appropriate backup because of his mining expertise and familiarity with the site, and the two coordinated closely on the planned work.